

THE
PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE FIFTEENTH ANNUAL MEETING
OF THE AMERICAN PSYCHOLOGICAL ASSO-
CIATION, NEW YORK CITY, DECEM-
BER 27, 28 AND 29, 1906.

REPORT OF THE SECRETARY.

The fifteenth annual meeting of the American Psychological Association was held at Columbia University, New York City, on Thursday, Friday and Saturday, December 27, 28 and 29, 1906, in affiliation with the American Association for the Advancement of Science, the American Society of Naturalists and the American Philosophical Association. About one hundred members of the Psychological Association were in attendance, while many of the sessions attracted visitors from the affiliated societies. The total attendance at all the affiliated societies was very large.

The special meetings of the Association were held in the Psychological Laboratory, and the program of these is represented by the abstracts given below. Of the more general meetings in the which members of the Association participated, special interest attached to the address of Professor William James, as President of the Philosophical Association, on the 'Powers of Man.' Also to be mentioned are the opening address of welcome to the affiliated societies by President Butler, and the reception, on Thursday evening, by the President and Trustees of Columbia University, followed by a general smoker at the Faculty Club, the dinner of the Naturalists on Friday evening, followed by a joint smoker of the Philosophical and Psychological Associations, the luncheon tendered by the President and Trustees of the College of the City of New York, at their new buildings, which were inspected by the members of the various societies, and the reception at the American Museum of Natural History, on Saturday even-

ing, by the Trustees of the Museum and the Council of the New York Academy of Sciences.

An exhibition of recent scientific progress was held by the New York Academy of Sciences, at the American Museum of Natural History, during the period of the meetings. One section of this exhibition was devoted to psychology, and contained, among other things, a collection illustrating the various methods which have been devised by members of the Association for recording eye movements. Apparatus or results were demonstrated by Messrs. Delabarre, Huey, Stratton, Judd, Dodge and Dearborn. Professor Dodge also exhibited his transparent mirror exposure apparatus and an instrument for quickly determining the degree and plane of astigmatism; Professor Judd exhibited some of his apparatus for measuring geometrical illusions, with charts of results; Dr. Adolf Meyer exhibited some reconstructions, by means of superposed glass plates, of the occipital lobe and its fiber systems; Professor Henmon showed his quantitative test for color blindness; and Dr. Wells some simultaneous records of laryngeal and respiratory action in speech. Some recent foreign apparatus was also exhibited by members of the association, including a flicker photometer and Nagel's tests for color blindness, contributed by the Yale laboratory, and a set of Hegg's stable colors, contributed by Mrs. Franklin. Some other novelties were on exhibition at the Columbia laboratory, and were informally inspected, especially at a 'Conversazione of experimentalists,' which was arranged for Thursday afternoon.

The opening session of the Association was devoted to a discussion on the question of Organized Coöperation in Standardizing Psychological Tests. The discussion was opened by Messrs. Angell, Dodge, Judd, A. H. Pierce, Pillsbury and Warren. Considerable divergence of opinion came to light as to the proper aims and scope of such organized effort, and even as to the propriety of organizing it at all at the present stage of progress; the upshot of the discussion was however the appointment of a committee for further consideration of the matter and report to the Association at the subsequent business meeting.

At the annual business meeting, held on December 28, the following business was transacted: Election of officers for 1907: *President*, Dr. Henry Rutgers Marshall of New York; *Members of the Council to serve three years*, Professor C. H. Judd of Yale University, and Professor W. B. Pillsbury of the University of Michigan.

The following new members were elected: Dr. Jessie B. Allen, Los Angeles State Normal School; Dr. Roswell Parker Angier, Yale

University; Dr. Harvey A. Carr, Pratt Institute; Dr. Walter Fenno Dearborn, University of Wisconsin; Dr. Knight Dunlap, Johns Hopkins University; Dr. Samuel Perkins Hayes, Mount Holyoke College; Dr. Ernest Norton Henderson, Adelphi College; Dr. August Hoch, Bloomingdale Asylum; Professor William H. Howell, Johns Hopkins University; Professor H. S. Jennings, Johns Hopkins University; Dr. Fred Kuhlmann, Clark University; Dr. Paul R. Radosavljevich, New York City; Dr. Frances H. Rousmaniere, Mount Holyoke College; Professor John Edward Russell, Williams College; Dr. John Frederick Shepard, University of Michigan; Professor Edwin Diller Starbuck, State University of Iowa; Dr. F. M. Urban, University of Pennsylvania; Dr. F. Lyman Wells, Columbia University; Professor C. O. Whitman, University of Chicago.

In connection with the election of new members, the Council made a formal announcement to the Association of the principles which guided them in nominating or declining to nominate individuals proposed for membership. The Constitution reads that those are eligible for membership who are engaged in 'the advancement of Psychology as a Science.' In interpreting the Constitution, the Council has, historically and consistently, recognized two sorts of qualifications for membership: professional occupation in psychology, and research. The Council now adheres to a somewhat strict interpretation of the former of these qualifications, so that, in the absence of research, positions held in related branches, such as philosophy and education, or temporary positions, such as assistantships, in psychology, are not regarded as qualifying a candidate for membership.

The Treasurer's report, audited by the Council, was read and approved.

The Council reported that invitations for the next annual meeting had been extended by Cornell University and by the University of Chicago. On recommendation of the Council, it was voted to accept the invitation of the University of Chicago, power being given to the Council to arrange otherwise in case circumstances should arise to make a change of plan seem desirable.

The Council reported that, acting as a committee instructed by the Association at its last meeting to recommend action on the question of a bibliography after an examination of the bibliography of Dr. Rand, it regarded it as injudicious that anything further be done in the matter.

The Council made a report of progress in the matter of the guardianship and utilization of the accumulated fund, which matter had been referred to it at the preceding annual meeting.

On recommendation of the Council, it was voted that the Secretary of the Association be the Association's delegate to the Council of the American Association for the Advancement of Science.

The Council recommended an amendment to the Constitution to the effect that 'by unanimous vote the Council may drop any member of the Association who has not been engaged in the advancement of Psychology for a period of five or more years.' By vote of the Association, this matter was referred back to the Council.

The Council further recommended that Article IV. of the Constitution be amended by the substitution of the words 'two dollars' in place of 'one dollar,' as the annual subscription. This also was referred back to the Council.

The Committee appointed December 27, 1906, to consider the question of the appointment of a committee on measurements, reported as follows:

Your committee recommends the creation of a permanent committee of the Association, to consist of five members, which shall act as a general control committee on the subject of measurements. It is recommended that this committee undertake two general lines of work, organizing as many subcommittees as it shall see fit, and calling to its assistance such outside help as it may desire: first, the determination of a series of group and individual tests, with reference to practical application; and second, the determination of standard experiments of a more technical character. Examples of the second sort of problem would be the means of determining the limens of sound and of color. It is particularly recommended that the committee make the most explicit possible recommendations upon forms of apparatus, modes of procedure, and formulation of results. It is recommended that one session of the 1907 meeting of the Association be devoted to a consideration of the report of this Committee. It is finally recommended that the initial membership of the Committee be determined by the Council before the adjournment of the present meeting of the Association.

Respectfully submitted,

J. R. ANGELL, *Chairman,*

W. B. PILLSBURY,

H. C. WARREN,

C. H. JUDD,

C. E. SEASHORE,

E. A. KIRKPATRICK,

R. S. WOODWORTH,

Committee.

This report was adopted as the action of the Association, and the Council was instructed to appoint such a committee. (At a meeting of the Council held after the meeting of the Association, Messrs. Angell, Judd and Pillsbury were appointed as three members of the Committee, with power to select the remaining two. The membership of the Committee was completed by the addition of Messrs. Sanford and Woodworth; later, on the resignation of Professor Sanford, Professor Seashore was selected.)

A vote of thanks was tendered to Columbia University and to the College of the City of New York, for their hospitality.

It was voted that the Council appoint a representative of the Association to meet, with representatives of the American Association for the Advancement of Science, to consider the relation of the Psychological Association to the corresponding Section of the American Association. (At a subsequent meeting of the Council, Professor Cattell was appointed as such representative.)

REPORT OF THE TREASURER FOR 1906.

DR.

To balance from last meeting.....	\$2,768.82
Dues from members	173.10
	<u>\$2,941.92</u>

CR.

By expenditures for	
Stationery and printing.....	\$85.10
Postage	25.00
Clerical assistance.....	71.30
Proceedings	11.05
Smoker at Cambridge	21.68
Travelling expenses	28.00
Expenses Committee on Bibliography.....	2.39
Telegrams.....	3.20
	<u>247.72</u>
	<u>\$2,694.20</u>
Accumulated interest	75.97
Amount in bank December 28, 1906.....	<u>\$2,770.17</u>
Audited by the Council.	

WM. HARPER DAVIS,

Secretary and Treasurer.

ABSTRACTS OF PAPERS.

The Visual Estimation of Spatial Magnitudes. SIMON NEWCOMB.
A Scientific Criterion of Literary Merit. F. LYMAN WELLS.

A study in relative position applied to literary standing. It is possible to obtain the order of merit in ten of the foremost American writers with an average probable error of only one half of the consecu-

tive differences in position. It is possible to estimate general merit more accurately than the qualities which constitute it. The order of importance of the various qualities corresponds with the order of accuracy with which it is possible to estimate them. The most and least prominent characteristics of a writer's work may also be obtained, as well as the accuracy with which his work can be analyzed. The results are a confirmation of the validity of the method, subject to proper interpretation.

Photography of Ocular Movements. GEORGE M. STRATTON.

Negatives obtained by photographing the eye's action under various conditions were shown in projection — records taken while viewing rectangles and circles in actual drawing, as well as while 'describing' these forms in imagination, by sweeps of the eye over a blank surface. Records were also included of the eye's action toward more complicated figures, and in attempting to pass in various prearranged directions from a central fixation point.

The method of reaching a correct interpretation of the records was shown, by which an allowance is made for the error due to the shifting of the reflected light upon the cornea, as well as to the irregularities of the cornea itself. The basis of correction is reached when a large series of fixations which form lines and figures are carefully photographed. When such records are superposed upon those obtained during free ocular movements the character of the eye's aberrations may be confidently and distinctly traced.

In judging the value of these records, in comparison with those of Dodge and of Judd, the special advantages of each method should be freely recognized. The signal virtue of the present method is that it gives a record, not only of the points of rest of the eye, but — most important of all — of the actual path which the eye pursues in passing from one fixation point to another. The points of rest, *without these interconnecting movements*, are faithfully recorded by Dr. Judd's method. The *time-features* of the eye's action, without the space form of its movements, are uniquely given in Dr. Dodge's work. Only the peculiar interest which dominates a piece of research can decide which is the best method to employ, for each procedure gives results which so far have been obtained in no other way.

Minimum Exposure in Experimental Studies of Reading. RAYMOND DODGE.

The tendency to reduce the physical exposure time in tachistoscopic study of reading to a minimum is a methodological error. It

is based chiefly on the psycho-physical fallacy that reduction of the duration of the stimulus decreases the complexity of the consequent psychological process. The contrary is the fact. Extreme reduction of the exposure time introduces into the experiment new and unusual conditions altogether foreign to the reading process. Whenever the products of these unusual conditions are mistaken for experimental disclosures, as in the discussions of Zeitler and Messmer, it leads to a distorted analysis of the processes of apprehension. While it renders the experimental conclusions, in so far as they are referred to natural reading, not only valueless but false.

The Rotation of the Eye During Fixation and in Movement.

CLOYD N. McALLISTER. (Read by title.)

Studies in Binocular Depth Perception. J. CARLETON BELL.

In the dark room two dots of light, 2 mm. each in diameter, are movable in a horizontal plane, 40 cm. from the eyes. The dots are observed through 11° prisms, so that, within certain limits of separation, corresponding points on the two retinæ are stimulated, and a single image is seen. When the dots are brought closer together the single image appears to approach; when they are separated more widely the image recedes. The amount of movement of the dots necessary to give rise to the judgment of approach is approximately the same for all parts of the scale, and the same is true of recession. This threshold is fairly constant for the same individual at different times, but varies greatly with different individuals, and is uniformly lower in all individuals for approach than for recession. When the dots are moved at a rather rapid rate the recession is perfectly smooth and uniform, while the approach is marked by definite jumps or swoops, shorter at the extremes of the scale, longer in the center.

The absolute distance of the image is estimated with remarkable constancy by the same individual at different times, but there is wide variation in individuals, more particularly in the estimation of the absolute distance of the image at the higher degrees of separation of the dots.

When the introspection as to the clearness and size of the image is compared with the estimates of absolute distance, we are led to the conclusion that we have to do here with two types of individuals; in the one, accommodation and convergence are closely associated, and along with lessened convergence goes a correspondingly relaxed accommodation, giving a blurred and enlarged image. In the other type there is a practical dissociation of accommodation and convergence, so that, even with the greatest divergence, the image remains

clear and of constant size. The distance estimates of the first type for a wide degree of separation vary between 20 and 25 feet, those of the second type for the same degree of separation vary between 2 and 4 feet.

Address of the President: *The Province of Functional Psychology.*

JAMES R. ANGELL.

(This address has appeared in full in the *PSYCHOLOGICAL REVIEW*, 14.61, 1907.)

Feeling Analysis and Experimentation. CHAS. HUGHES JOHNSTON.

The striking phases of the feeling problem are its particular prominence, the theoretical implications involved for the science of psychology, some evident shortcomings and oversights in recent analysis and experimentation, the limited aim and questionable import of reported experimental results, the peculiar difficulties which present themselves when one seeks to deal with affective psychoses experimentally, and finally the possible lines of departure from present methods of research which a survey of the work demands.

The first two considerations may demand a less restricted definition of psychology, and seem particularly to reveal the inadequacy of a purely structural description and explanation. The remaining considerations suggest on the whole that a workable distinction should be made between sensations and feelings, and that feelings should be classified and physiologically described, not by localizing them in certain invariably occurring bodily processes, but rather by grouping them with reference to the various kinds, degrees, rates, etc., of coördinated adjustment which seems to characterize them. Thus, the content aspect of sensations being referred to the sensory, and the subjective or intent aspect of feelings in experience being referred to the motor processes exclusively, we have the basis for describing two elements in such a way that recognizes their independent variability. Feelings have their own quality, intensity, and vividness incommensurate with the same attributes of the sensations that occur simultaneously, and hence are not characterized by even organic complexes viewed in sensation combinations.

Some Results of Experiments on Cerebral Circulation in Sleep.

JOHN F. SHEPHERD.

This paper concerns only the volume reactions in normal sleep and while the individual is lying down. Two subjects were used in the experiments. With the first subject the volume of the brain and of peripheral parts increases when the individual goes to sleep, and

decreases when he awakes. There is often a temporary fall of the brain volume preceding the more marked rise which shows itself as sleep becomes deeper. There is a prominent breathing wave in the plethysmographic records from both brain and periphery. This wave is such that the fall in the circulation record very nearly corresponds to an inspiration, the rise to an expiration. If there is any difference, the fall in the brain volume shows itself a fraction of a pulse beat before the respiration curve begins its descent. Stimuli that disturb but do not awaken the subject cause a temporary increase in breathing in both chest and abdomen, a fall of volume of the brain and peripheral parts with comparative elimination of the breathing wave therein. When the subject is sleeping soundly and there are apparently no distinct stimuli acting, one often finds a more or less rhythmic repetition of such changes, analogous to the Traube-Hering wave. There is always some evidence of this wave, and the changes in brain and periphery are always parallel.

The second subject has been acting only recently. The results with him have not been so decided. There is usually no doubt of an increase of volume of the brain when the subject goes to sleep. And in several cases there is a marked fall with awakening. The Traube-Hering wave in the volume and in the breathing is not so prominent, but it is still present, and its relations are the same. The breathing wave in the brain curve, on the other hand, often but not always seems to follow the depth of breathing, and to be larger while the subject is awake. The variations may be due in part to the fact that the subject was more nervous and never slept very soundly nor very long during the experiments, and in part to the greater difficulty in eliminating movements, particularly those of respiration.

The Difference Between a Habit and an Idea. STUART H. ROWE.

Much confusion has resulted pedagogically from a failure to distinguish between ideas and habits in methods of teaching. Educators have extolled the value of habit but have taught as though it were to be gained by the same procedure as knowledge. Psychologists in their interest in the minuter problems of science have failed to impress the pedagogue with the seriousness, if not the ridiculousness, of his error. To this end an examination of the important differences will not be amiss.

1. The first essential difference is that habit is automatic in character. Its initial features suggest only one set of consequent features. On the other hand the initial phases of an idea are not followed by any given consequents directly.

2. Habit is always a serial affair. It begins with one avenue of approach and continues along an established succession of associations. The idea however has many avenues of approach and once reached may lead to this association and now to that with a freedom quite different from that fixedness which distinguishes habit.

3. Habit represents a conserving tendency in mental life. On the other hand the idea in its very function adapts itself to additional points of view and modification.

4. As a habit becomes more and more fixed, we lose sign of the details involved and the feeling element tends to fade out; but an idea is dependent on its detail for its serviceability. Even an abstraction loses its vitality if stripped of its data. Moreover in contrast with habit the feeling phase of the idea fluctuates, that is, it becomes more prominent or less so as new aspects of a situation strengthen or weaken the prevailing mood.

5. Progress in a definite line of habituation is accompanied by a release of attention and a reduction in the fatigue accompanying the effort. Ideation implies attention; and, if the idea grows more complicated and so requires a greater effort of attention to keep its various phases focalized, greater fatigue results.

6. Habit implies repetition, practice over the same neural path. An idea may be gained through a single experience.

7. A habit is specific, although this fact does not preclude for it all suggestiveness beyond itself. The idea however is not well defined. It is manifoldly suggested and suggesting. It may be regarded from many points of view and takes on varied aspects in accordance with them.

8. There is an extensive groundwork of reflex and instinctive inheritances, out of which special habits of adaptation develop as complex adjustment to the environment is accomplished. The child's first steps in ideation are seriously handicapped by the lack of any such groundwork for ideas.

The Relation of Imitation to the Theory of Animal Perception.

GEORGE H. MEAD.

Imitation, in the full sense as used by Hobhouse, demands in an animal a perception of his act and of its consequences — such a perception as would make the animal aware of some 'character' of the event in such a way as to utilize this character in subsequent reactions to the stimulus. In Mr. Thorndike's analysis this conception of animal behavior is replaced by a conception of the association of impulse with stimulus instead of the association of states of consciousness as such.

By a system of trial and error the animal's impulses are provided with appropriate stimuli. The cement for this association he finds in pleasure and pain. This association of impulse with sense stimulus leaves no room for imitation in Hobhouse's sense, though there might still be mimicry and automatic imitation.

Perception cannot properly be inferred from such animal conduct as finding the way through a maze, for there each step simply provides the stimulus for the next, and there is no necessity that the intermediate acts should be perceived as mediating the outcome. But where the intermediate acts must be adapted to final results, and where they can be inhibited, so that there exist relations of mutual control between the intermediate acts and the final act, there we should have, in a possible consciousness, just the contents which are called for in perception. The type of reaction which best lends itself to this mediating experience out of which perception may arise is the type represented by tricks which require some sort of manipulation as the means to the final act, *e. g.*, the opening of a door by various devices, the use of a stick, etc. This type is of interest because it recalls the fact that our own *perceptions* consist so largely in the interpretation of what comes through the eye, the ear, and other distance sensations, through the suggested kinæsthetic experience of possible contact. This fact, which lies at the basis of the older distinction between the primary and secondary sensations, and finds further expression in the inevitable presentation of the outer world in terms of solid matter, *i. e.*, in the imagery of actual manipulations, this fact suggests that a rich kinæsthetic experience in manipulation may be almost a precondition of perception, that is, that the sort of mediate experience in which stimulus and response would mutually control each other in the adaptation of one act to another could hardly arise before the primate with his highly sensitive flexible hand.

If we accept this or an analogous definition of perception it would follow that imitation could not arise as a conscious phenomenon before such mediate acts appeared. One cannot have imitation in this sense without perception, and given perception it is hard to see how imitation can lag far behind.

Kinæsthetic Sensations: Their Rôle in the Reactions of the White Rat to the Hampton Court Maze. JOHN B. WATSON.

After determining a normal average record of the time taken by adult rats in learning the maze, tests were made to determine the sensory factors used in learning it. Removing the eyeballs, plugging the ears and destroying the tympanic membrane, extirpating the olfac-

factory bulbs, cutting the vibrissæ, anæsthetizing the soles and snout — none of these subtractions of sense data prevented normal reactions in animals which had already learned the maze, nor lengthened the time of learning. Disturbances of temperature were likewise without effect. Nor did a loss of more than one of these senses by the same animal seem to alter the result. Rotating the whole maze through an angle did seriously disturb the acquired reaction, though readjustment occurred promptly.

Habit Formation in the Starfish. H. S. JENNINGS.

An account of experiments showing that by a course of training the starfish may be induced to use habitually a certain pair of rays on which to turn in the righting reaction. The habit lasted in certain cases three or four days.

Modifiability of Behavior in the Dancing Mouse. ROBERT M. YERKES.

Visual discrimination tests show that the dancer avoids a disagreeable stimulus after about one hundred experiences. This modification of behavior occurs more quickly in the male than in the female. It persists for from two to six weeks.

Labyrinth tests are serviceable in the study of the dancing mouse only when the avoidance of some unfavorable condition is demanded. Neither escape from confinement nor the obtaining of food furnishes satisfactory motives for the following of a labyrinth path. The animal can find its way readily in a simple labyrinth without the guidance of sight, smell and touch. Thus far my experiments indicate the superiority of the female in the acquirement of labyrinth habits.

Even after a habit is no longer apparent relearning takes place far more quickly than the original modification in behavior. In other words, modifiability is increased by modifications of behavior.

Further Study of Variability in Spiders. JAMES P. PORTER.

In continuation of an earlier report, facts and observations were given, and illustrated with lantern slides, to show the great variability of spider webs and cocoons.

The Effect of Distraction upon the Intensity of Sensation. I. MADISON BENTLEY.

The relation of attention to the strength of sensation has, for years, been a vexed question to which casual observation and experiment have alike failed to return a final and satisfactory answer. The inherent difficulty of the problem is reflected in the wide range of current opinion. One psychologist, *e. g.*, holds to an unqualified, another to a

qualified intensification through attention, still another declares for the absence of positive effect, while a fourth maintains that attention actually impairs the strength of sensational processes.

New experiments undertaken with the fall-phonometer indicate that distraction diminishes by approximately the same relative amounts the intensity of weak and of strong momentary noises. Further research is needed to show (1) whether the observed diminution is a general function of distraction, and also (2) whether a thorough analysis of the 'distracted' consciousness will not reveal more specific relations than are at present recognized as existing between the state of attention and the intensity of individual sensations.

A Contribution to Applied Tone-psychology. C. E. SEASHORE.

The discussion was limited to the significance of the power of discrimination for musical pitch in individual psychology. On the basis of measurements on university students, high school pupils, and grammar school children, it was shown that the distribution of the pitch-discrimination capacities does not follow the distribution of records of discrimination in other respects, *e. g.*, intensity of tone or visual space; it is not correlated with general intellectual capacity; it does not show close correlation with musical education; it does not show close correlation with acuity of hearing, but resembles the distribution of acuity of hearing; and the physiological threshold rises with age — children are more sensitive to tone differences than adults.

The individual differences (*e. g.*, from one-hundredth to a half of a tone) are due to differences in physiological structure. There is no reason for supposing that training can improve the peripheral organism for pitch discrimination any more than training can improve the physical basis for acuity in hearing. Experiments were cited to show that it is possible to make a satisfactory rating of a child's capacity in this respect in a brief test, and that twenty days of specialized training in this acuity give no evidence of improvement with practice. Pitch discrimination is one of the fundamental requirements for ability in production and enjoyment of music. It is possible and worth while to measure a child's capacity in this respect before beginning a musical education.

Tonal Reactions. E. H. CAMERON.

The apparatus used consisted of a diaphragm and levers which traced the record upon a smoked paper surface. The most important results may be summarized as follows:

1. In the singing of a tone a sudden marked rise in pitch usually occurs immediately after the beginning of a tone.

2. No tone is sung entirely uniformly. It oscillates in pitch from moment to moment in a somewhat irregular rhythmical manner.

3. Very marked differences exist in different individuals with respect to their ability to imitate standard tones. The subjects tested varied from a deviation of a small fraction of one per cent. to thirteen per cent.

4. There is manifest throughout a tendency to sing a tone higher than it should be sung. The end of a tone is usually higher than the beginning and a sung tone is almost unavoidably higher than the tone imitated.

5. Distractions when causing disturbances may affect the whole of the sung tone or only the beginning of the tone. In either case the effect of the distraction may be to cause the sung tone to vary from the standard (1) in the direction of the distracting tone; or (2) in the opposite direction from the distracting tone.

6. Sung tones varying from a standard under the effect of distractions are usually harmonious with the distracting tones. When the distracting tone is inharmonious with the standard tone, distraction is more likely to occur than when the two tones are harmonious.

A Proposed Method for Teaching Æsthetics. ELEANOR HARRIS ROWLAND.

I. Aims of a course in Æsthetics. Difficulty of carrying it out because with many American students there *is* no æsthetic feeling. This feeling must be *aroused* as well as analyzed and explained.

II. Ease and difficulty in arousing æsthetic feeling for different Arts. (a) Can arouse it with lyric, epic and dramatic poetry, prose and music because we have access to *originals*. (b) In most colleges we do *not* have originals for the arousal of æsthetic feeling in painting, sculpture, architecture. We cannot expect real æsthetic feeling for paintings, seen only through photographs, with *color* elements lacking; or for sculpture seen only in casts with fine modeling entirely absent or through photographs, where size is altered and the third dimension lacking. (c) Students do not come in contact with *modern* art at all, except through the magazines. How can they discuss intelligently an art they have not seen, or a mental state they have not experienced?

III. *Remedy*.—Museum Extension Movement. (a) Loan exhibits. (b) Conduction of students through museums with artists to explain masterpieces. (This has started in Boston, but other Museums have become interested as well.)

IV. *Method*.—(a) In discussion of arts, literature and music

bring samples before student, and be sure he *enjoys* them before any further work is done. (b) If they aren't sure they enjoy them, place *poor* art beside them to emphasize difference. (c) Show *photographs* of painting and sculpture to find what they get from them alone; and then take students through museum to show them *originals*.

V. There is a demand from grade schools for systematic æsthetic work to be combined with history. Any such help must come from colleges.

An Attempt to Harmonize the Current Psychological Theories of Judgment. W. B. PILLSBURY.

Four theories of judgment are current to-day in different more or less psychological circles or are implied in popular usage. These are the definitions of Marbe, that judgment is comparison: the definition of Ehrenfels and of Ribot in his *logique des sentiments*, that judgment is evaluation: the neo-Hegelian definition that judgment is ascription of meaning to the given, and the theory of the Dewey school that judgment arises from conflict and doubt. There are elements of agreement in each that are often overlooked, but which become evident if we analyze the processes immediately involved. Comparison, as the investigation of Marbe and others shows, has no particular mental accompaniment other than the simultaneous or successive presence in consciousness of two objects with the preliminary question how much? or how long? or east or west? Even in comparisons over long periods there is still no sign of weighing or other ascertainable mental action and in many cases not even the immediate presence in consciousness of the first member of the pair. Rather the comparison is by reference to a common standard, often formulated in a word. In evaluation exactly the same process goes on except that the standard is an immediate term in the comparison and is often incapable of formulation in language or definite imagery. Both judgments are comparisons, in each there is nothing in mind but the question that precedes and the assertion that results, and in each the point of reference is a standard that has grown through long experience to serve as a norm of appreciation. The third definition is almost identical if we may be permitted to give psychological body to the spirit of meaning. If meaning is anything it is the set of standards or schemata that have grown up to rectify experience and these are always called out by any sensation. We see objects not as they are but as we know they ought to be. Standard rectangular table tops are seen, not the trapezoid that is on the retina. The standard or meaning that attaches depends upon the mood or problem that is in mind as one looks and the first

consciousness is of the complete standard object not of the meaningless sensation, just as in comparison the essential elements are the question in mind and the resulting appreciation. Evaluation is an intermediate stage between comparison and the more usual process of attachment of meaning as we see it in perception, as comparisons in memory mediate between evaluation and simple comparison. All three are alike in so far as they depend upon the situation and result immediately in an interpretation of the situation. The two last are alike in the reference to a preëxisting standard. The fourth theory that belief grows from doubt resolved is like the others in its insistence upon the situation or problem, but would restrict the definition to the peculiar cases where two or more solutions are possible. The restriction of the term depends not altogether upon the real conditions of the action nor upon the result, but rather upon the feeling that accompanies. This seems rather a slight reason for abandoning current and historical usage.

A Classification of Perceptual Processes. KATE GORDON.

The most general characteristics of consciousness are probably the four so-called attributes of sensation, quality, intensity, duration and extensity. Quality is properly to be called an elementary, sensational, or felt aspect of conscious life, but intensity, duration and extensity seem to me to be better designated as types of perception or ways of apprehending that quality. Perception always involves some elaboration of the stimulus, some reference to other things, and there is now a tendency in psychological thought to make the thing ultimately referred to, some aspect of the motor response to the stimulus, in other words, you do not perceive a thing until you see to some extent what to do about it. My thesis is that these different kinds of perception—the intensive and the extensive (including the temporal and spatial)—have been derived from and have now some reference to the different phases of primitive motor responses. These responses are said by some writers to be contraction from pain and expansion to pleasure. Stanley speculates that ‘strenuousness through and by pain is primal.’ In reacting then from a painful stimulus certain types of movement are made, and these movements form the basis of our perceptions of intensity, duration and extensity. Thus the first form of reaction to pain is a contraction of the organism. This means to the organism a breaking of certain contacts with the environment and a tension towards a fixed center within the organism, in other words it means an experience literally of concentration and intensity. The mere presence of the stimulus, *i. e.*, the mere fact of pain is a quali-

tative or sensational experience, but the stimulus as an intensive magnitude is perceived in terms of the amount of the subject's own contraction. If, however, this first intensive reaction is not sufficient to break the contact with the painful stimulus then something different in kind must be done. Now a thing which cannot be avoided may often be modified so as to diminish its painfulness, and a stimulus which, if taken all at once, is painful can be made more agreeable if taken in gradually or in extended form, *i. e.*, a stimulus which can be 'spread' whether temporarily or spatially has thereby its intensity reduced. Movements, then, which tend to diffuse an impression are at the bottom of our perceptions of duration and extent. The progress from intensive to extensive perception is also a progress from the relatively implicit to the more explicit kind of apprehension and represents greater control over environment.

Imagery Illusions. The Non-visual Character of the Proof-reader's Illusion. A. H. PIERCE.

(1) The usual description of the proofreader's illusion is to the effect that the wrong word is seen, perceptually, by the reader. The fact seems rather to be that only certain fragments of the word are seen and that these arouse a verbal *image* that is not in accord with the text. The verbal image differs with the individual. It may be articulatory, or auditory, or, in the case of purely visual readers, visual. But in any event the illusion consists in the non-correspondence between an image and the printed word rather than in the presence of an erroneous perception. The mistake may be called an illusion because, functionally, the results are the same as if the experience had been entirely perceptual. But to distinguish this variety of mistakes from others they may perhaps well be called imagery illusions. (2) Illusions may be classified on the basis of their persistence and consequent examinability. Thus most of the geometrical-optical illusions are stable and permit of examination without danger of being destroyed, while illusions like the taking of a hat and coat to be a man are likely to dissolve and elude examination, and imagery illusions are by their very nature such that they permit of no reinstatement and thus of no examination whatever.

Non-sensory Components in Sense Perception. R. S. WOODWORTH.

A percept is not properly described as a synthesis of sensation and image, for the image is often not present when the percept is perfectly clear and definite. It is better to call the percept simply a 'mental reaction' to sensory stimulus, and to recognize that a reaction, as a new event, probably has a quality of its own, which may be called a

'percept quality.' (This paper appeared in full in the *Journal of Philos., Psychol. and Sci. Methods* for March 28, 1907.)

The Mental Antecedents of Voluntary Movements. EDWARD L. THORNDIKE.

Evidence was presented to show that: First, the images of the resident and remote sensations caused by a movement are common accompaniments of willing *not* to make it and are therefore very likely irrelevant to its actual volition; second, we can will acts, images of whose resident and remote sensations are utterly unobtainable; third, we do as a rule will acts in the case of which such images are obtained rarely and with great difficulty. Attention was also called to the fact that pragmatically at least such images are commonly irrelevant factors, since in trying to get anyone else to make a voluntary movement we rarely use means specially useful in calling up such images and often do take means specially to prevent their appearance, and also to the fact that to insist on the image's effective presence implies a sharp division of an unlikely sort between voluntary and involuntary action. It was suggested that the belief in images of the movement as necessary antecedents of the movement was a relic of the disposition, common in the childhood of psychology, to crave that a mental state, to be efficient, should *be* like what it *does* or brings to pass. (This paper appeared in full in the *Journal of Philos., Psychol. and Sci. Methods* for January 17, 1907.)

The Influence of the Duration of Movements upon the Estimation of Their Lengths. JAMES H. LEUBA.

The precision of our estimation of movement has been found to be independent of the position of the moving limb (provided the change of position did not bring into play new muscles) and of the resistance encountered by the limb. The precision is, moreover, the same for passive as for active movements.

Touching the influence of velocity, there is no agreement beyond the recognition of its importance. Loeb, Delabarre and others found that increased velocity brought about a marked decrease in the apparent length of the movement. Angier, however, reports consistent evidence to the contrary. But the investigations of Angier and of his predecessors were so narrowly limited with regard to the velocities, directions and extents of the movements studied as to preclude, in my opinion, any generalization. Moreover, their work was seriously deficient in exactness. In Loeb's experiments the subject was simply told to move faster or slower. Angier did better: he used a metronome.

The precondition of further progress is a method admitting of an

exact measurement of the time consumed by the movement. In my experiments I made use of a light apparatus carried by the index finger and so contrived that, in whatever direction the hand moved, the beginning of the movement makes an electrical contact. A break is caused by lifting the finger. The makes and the breaks are recorded on a kymograph drum below a time line. The results are as yet too fragmentary to warrant any conclusion.

A Measure of the Child's Visual Image and the Correlation of this with School Efficiency. FRANK G. BRUNER. (Read by title.)

The Psychology of Examinations. BROTHER CHRYSOSTOM. (Read by title.)

1. All successful teaching presupposes some kind of examination as a condition by which the teacher may gauge the rapidity of his exposition and the nature of his method; for, to quote St. Thomas, to teach is to produce science in the mind of another. From time to time, therefore, it becomes necessary to determine to what extent the pupil has assimilated the meat offered him by his preceptor, since education aims rather at power than at information.

2. When we compare the oral examination in circumstance and effect with the written test, we find it much inferior to the latter. Indeed, the written examination is psychologically defensible not merely on the ground that it revives memory and interest, but also because it demands the translation of one's thoughts into visual impressions through the medium of motor activity.

3. Moreover, any right use of examinations by the student involves a survey of the subject in which he is to be examined, at least in its broader relations to other subjects and in the relation of its parts to one another. This exercise of association or of apperception is a prominent factor in the development of mental power, and hence may throw light upon the workings of the youthful mind or upon one or more of its special gifts. This result may be greatly enhanced by returning corrected papers to him that he may not only see what is good and what defective therein, but also that he may reconstruct the subject in his own mind according to the standard set by these marks.

4. Furthermore there is often a great gain in giving him a choice of questions to be answered, provided, of course, that the questions may be fairly rated as of equal importance. Because it is a general rule that he will follow the lines of least resistance, we may safely infer that the questions unanswered are for the present beyond his grasp or, at least, outside his centers of interest. If this plan were consistently followed out in all his studies and the papers carefully

collated, it would be possible to draw up a good working map of his mind for the guidance of the teaching staff. This would be of great value in enabling the professor of any given subject to adapt himself to the level and the capacity of the individual student.

Visual Pressure Images; Their Nature and Their Relation to the Visions Due to Mescal and Other Drugs. E. B. DELA-BARRE. (Read by title.)

Pressure on the eye-ball produces a series of images, often very striking in form, motion and coloring. Most of them are of brief duration, rapidly giving place to others. Among the figures of most frequent occurrence are: irregular flashes or clouds of brilliant, delicate coloring; isolated spots of prismatic colors; mosaic arrangements of alternately colored squares, circles, or other forms; serpentine figures; six- or eight-rayed star patterns; zigzag, wavy or curved systems of delicate parallel lines; rapid streamings or surgings as of a boiling fluid, in circular, spiral or vortical motion; and others.

When carefully observed, these are probably not hallucinatory, but due to actual stimulations of the retina. Many of them can be definitely traced to known peculiarities of eye-structure. When not accurately observed, they would naturally be subject to varying degrees of hallucinatory interpretation, to whose content they would give, however, a recognizable tinge. Descriptions of visions observed under the influence of mescal seem to show that the visions are predominately due to this cause.

College Students' Ideas of God. JAMES H. LEUBA. (Read by title.)

A preliminary report upon nearly a thousand answers from college students to a syllabus. The questions were in almost every case during a regular class-hour. The intention was to gather information on students' ideas of God as they are before technical philosophical knowledge is brought to bear upon them.

Indications of Incipient Fatigue. WILL S. MONROE. (Read by title.)

Benjamin Rush, M. D., on Mental Diseases. I. WOODBRIDGE RILEY. (Read by title.)

Benjamin Rush (1745-1813), professor of the institutes of medicine in the University of Pennsylvania, has been called the father of American psychiatry; he was at least the first of the Philadelphia school of materialists to combine lectures on abnormal psychology and psychotherapeutics with a regular medical course. Rush early observed that the diseases of the brain should be narrowly watched,

since they often produce discoveries of the secret powers of the mind; like convulsions of the earth, which throw up metals and precious stones, that would otherwise have been unknown forever. In the essay on 'The Influence of Physical Causes upon the Moral Faculty' (1786), Rush calls the latter's partial action *micronomia*, its total absence *anomia*, and connects both these with the preternatural irritability of the nervous system. Here also the influence of association upon morals is strong, suicide being often propagated by the newspapers and monstrous crimes by the publication of court proceedings. The essay on 'The Influence of Physical Causes upon the Intellectual Faculties' (1799) holds that the enlargement and activity of the latter are as much within our power as the health and movements of our bodies. The lecture, 'On the Utility of a Knowledge of the Faculties and Operations of the Mind to a Physician' (1805), attempts a pathological explanation of the morbid phenomena of dreams, trances and phantasms and gives an authentic case of continuous secondary memory in successive somnambulisms. An earlier article on 'The Different Species of Pholia' (1786), defines the latter as a fear of an imaginary evil, or an undue fear of a real one, and leads to Rush's last and largest work, 'The Medical Inquiries and Observations upon the Diseases of the Mind' (1812). This presents a new nomenclature of mental diseases from *tristimania* to *manalgia*, suggests as a cure for *aboulia* Brissot's use of animal magnetism, and for insanity of doubt, the employment of positive assertions. In the chapter on derangements of the memory, there is an implicit recognition of the various forms of amnesia, as an oblivion of names and vocables, of the sound of words but not of the letters which compose them, of the qualities and numbers of the most familiar objects, of events, time and place. Rush's work concludes with a recognition of the moral imbecile, of the criminal insane, whose morbid operations of the will are to be considered not as vices, but as symptoms of a disease.

This paper is extracted from a chapter in a forthcoming history of 'Philosophy in America.'

Recent Tendencies in the Psychology of Values. W. M. URBAN.
(Read by title.)

(This paper has been published in full in the *PSYCHOLOGICAL BULLETIN*, 4, 65, 1907.)

PSYCHOLOGICAL LITERATURE.

EMOTION.

Pathologie du sourire. GEORGES DUMAS. *Revue Philosophique*, 1905, LIX., 580-595.

Dumas' hypothesis in regard to the origin of the smile developed in previous papers may be stated as follows: The smile is produced by any slight excitation of the facial nerve and can receive a purely mechanical explanation. The object of the present paper is to find support for this mechanical theory in pathology.

If the theory be true we ought to find, that (I.) all pathological causes which lessen the tonicity of the muscles of the face cause the expression opposite to the smile, *i. e.*, sadness, and that (II.) all pathological causes which increase the tonicity of the muscles tend to produce the smile.

I. In passive melancholia, the motor impulses are weaker than normally, the muscles are flabby, inelastic, and relaxed. As a result of this relaxed state of the muscles of the face, the expression is that characterized as sad; the nose is thinner and longer, the eyes half-closed, or open and dull, the eye-brows flattened, the corners of the mouth drawn down. Again in facial paralysis, in cases of hemiplegia, when the muscles of one side of the face are in a state of continued relaxation, the expression of this affected side presents the characteristics of sadness enumerated above. From these examples Dumas formulates the principle that all lesions of the facial nerve at any point, in the measure in which they cause a decrease of motor stimuli, and diminish the tonic action of the facial muscles, necessarily cause the expression of sadness.

II. In mania where the muscular tone is higher, the expression of the face is a constant smile.

Again in contractures of one side of the face, the expression of the side affected is as markedly a smile as in the cases of facial paralysis it was the opposite. The corner of the lip is lifted, the cheek rounded, the nostril extended. If the contracture is very intense, the stimulus affects other less mobile and antagonistic muscles to those involved in the smile and the resulting expression is nearer a grimace.

These examples support his conclusion that the smile is the easiest motor reaction to every slight stimulus of the facial nerve, whether the

stimulus be due to nervous or electrical energy, or to changes in circulation, or to inflammation.

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Le préjugé intellectualistic et le préjugé finaliste dans les théories d'expression. GEORGES DUMAS. *Revue Philosophique*, 1905, LX., 561-582.

In his former papers (*Rev. Philos.*, LVIII., 1-23; 136-151) the author reached the conclusion that the smile is the result of a slight stimulus just sufficient to produce the easiest reaction of the facial muscles by the coöperation of 15 of those that work together or, at least, do not oppose each other. He holds that similar explanations may be given for the motor expressions of the other emotions. In this paper he considers especially the expressions of the four fundamental emotions of joy, anger, grief, and fear, the first two being manifestations of hypertonicity, the last two of hypotonicity. An increase of the muscular tonicity greater than that of joy, explains the motor expressions of anger; while a diminution, almost a suppression, of the muscular tonicity, a lesser diminution of which explains the motor expressions of grief, accounts for those of fear. The author gives a biological description of the factors, peripheral and central, controlling muscular tonicity.

Dumas offers his explanation as against those given by Darwin, Spencer, and Wundt, who, he says, were prejudiced in their theories of expressions by what he calls the intellectualistic and finalistic tendencies. They were each, especially Spencer, in some measure aware of the mechanical laws of excitation and depression, but were unwilling to accept these as in themselves an adequate account of emotion expression. Dumas quotes some of the examples as explained under their principles by Darwin, Spencer, Wundt, and Mantegazza, points out the manifest puerility and faulty analysis, and shows how his own principles of hypertonus and hypotonus could be applied to the same instances.

Finally he thinks that further generalization should be possible that would explain, in like manner, the variations, during the emotional experience, in nutrition, in circulation and respiration, and finally in the intellectual states. Emotions then when looked upon as complex biological facts reveal the importance of the great laws of excitation and depression, which ought to be at the base of all study of their psychology. But though Dumas gives considerable confirmation of the importance, in the explanation of emotional expressions,

of these laws of hypertonus and hypotonus, he fails to give sufficient reason for his assumption of a conflict between these biological principles and what he calls the psychological explanations given by Darwin, Spencer and Wundt.

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THEORY OF TIME.

Ueber Lokalisation von Druckreizen der Hände bei verschiedenen Lagen der letzteren. HANS RUPP. Ztsch. f. Sinnesphysiol., 1906, XLI., 127-153.

The writer gives the results of an investigation into the problem concerning the relation of the times necessary for locating, with eyes closed, tactile stimulations on different parts of the hand. Or more specifically, what is the relation of the reaction times necessary in naming the hand or finger on which the touch is experienced in case the hand is found in different locations?

A Hipp chronoscope was used in connection with a Kraepelin electric pen which released the current and a lip-key which closed it when the name of the hand or finger affected was pronounced.

The trials were made with the hands in different positions, thumbs above, below, hands crossed, fingers crossed, also with hands behind the back.

Tables of results are given. These show that it cannot be laid down as a law that it takes longer to name the fingers stimulated when crossed than when held parallel. But in naming the hand more time is required when fingers are crossed than when they are parallel. Naming the hand requires a longer time when hands are crossed. Naming the fingers with thumbs down requires more time than with thumbs up, whether hands be crossed or not. Where hands and fingers both are crossed the time is lengthened. The results gained in regard to simple reaction to stimulation of hands and fingers in various positions were not decisive. The experiments suggest an interesting field for further work.

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C. B. McMULLEN.

DIZZINESS.

Beitrag zur Lehre von den Funktionen der Bogengänge. ROBERT BARÁNY. Zeitschr. für Sinnesphysiol., 1906, XLI., 37-44.

According to the older view of the functions of the semi-circular canals it was held that when the body is rotated about its vertical axis the displacement of the endolymph stimulates the vestibular nerve

endings and gives rise to sensations of rotation. These rotation sensations in turn occasion those movements of the eyes known as nystagmus. The more recent view, as expressed by Nagel in the *Handbuch der Physiologie*, is that the nystagmus is a reflex directly coördinated with, and not caused by, the sensations of rotation. Bárány, in this article, reverses the relationship and furnishes experimental evidence to show that the sensations of rotation are, at least in part, caused by the nystagmus movements, since in certain cases where there is no nystagmus the sensations of apparent rotation are also lacking.

After rotation to the right has ceased a horizontal nystagmus is observed, the slow phase of which is to the right. When the eyes are open, therefore, objects in the visual field appear to be moving to the left, and with closed eyes the subject's own body appears to be rotating to the left. Bárány finds that by directing the gaze strongly to the right the nystagmus may be inhibited, and along with it the sensations of moving objects or of the rotation of the body disappear. If the gaze is now directed to the left the nystagmus reappears and the sensations of apparent rotation return. In like manner disturbances of equilibrium are found to be associated with nystagmus, and are inhibited with inhibition of the nystagmus. The sensations of eye-movement, then, would seem to be the chief cause of the apparent rotation and of the disturbances of equilibrium, and the function of the semicircular canals would be confined to calling forth the reflex slow phase of the nystagmus. The presence and degree of nausea in rotation dizziness varies with individuals, and is probably due to a direct connection of the semicircular canals with the nerves of the alimentary canal through the nuclei of the medulla.

A clearer and more lucid analysis of the phases of nystagmus and their control is given by Holt ('Vision during Dizziness,' *Harvard Psychol. Studies*, 1906, II., 67-73), who reaches practically the same conclusions as Bárány.

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ÆSTHETICS.

The Essentials of Æsthetics in Music, Poetry, Painting, Sculpture and Architecture. GEORGE LANSING RAYMOND. New York, G. P. Putnam's Sons, 1906. Pp. xix + 404.

The general position maintained by the author in this book is that art is nature made human. "Art of the highest and finest quality," he says, "involves three things: First, a reproduction of the phenomena of nature, especially its sights and sounds; second, an expres-

sion of the thoughts and emotions of the artist; and, third, an embodiment of both these other features in an external product like a symphony, a poem, a painting, a statue, a building." Beauty is defined as 'a characteristic of any complex form of varied elements producing apprehensible unity (*i. e.*, harmony or likeness) of effects upon the motive organs of sensation in the ear or eye, or upon the emotive sources of imagination in the mind; or upon both the one and the other.'

The artistic impulse is identified with the play impulse, and is differentiated from the religious and scientific consciousness by reason of the fact that it involves both subconscious inspiration — by which the author seems to mean intuitive mental action — and conscious investigation and observation; whereas the religious consciousness involves dominantly the former, and the scientific consciousness, the latter. Art, then, 'is a development of the earliest endeavor of men to give form to thought for which they have no form at their command.' The artistic temperament is quick to apprehend the effects of nature, to seize upon and represent them in a significant fashion. Art is not a means of communication, but of representation. Since the 'art-impulse' is attributed to the 'life-force' issuing from the subconscious or spiritual nature of man, it follows that this personal note dominates his product; and the product will be successful in the degree in which it represents the artist's surroundings in such ways as to manifest his own personality, his individual thoughts and emotions. This renders his work distinctive, but not less universal for that, since he derives his concepts direct from nature.

According to the three normal impulses: religious, scientific and artistic, there are three sorts of art: idealistic, realistic and idealized realistic. The first emphasizes the good, may be characterized as sublime, grand, or horrible, and finds its adequate expression in the epic form. The second emphasizes the true, may be characterized as picturesque, simple, or pathetic, and finds its adequate expression in the realistic form. The third emphasizes the beautiful, may be characterized as brilliant, striking, or violent, and finds its adequate expression in the dramatic form. An art-product which is neither distinctly epic, realistic nor dramatic is lacking in definiteness of effect, and usually felt to be inartistic. The argument here is rather dogmatic and not thoroughly convincing.

In discussing the elements of form, the author considers first the influence and significance of duration, pitch, intensity and quality in the arts of sound; then, in the arts of sight, he attempts, by analogous

treatment, to show the relation of size or extension, shape or outline, solidity and temperature respectively to each of the first mentioned elements. The general conclusion is that 'certain audible or visible effects traceable to material or to human nature have, either by way of comparison, as in imitation, or of association, as in conventional usage, a recognized meaning.' It is not quite clear, however, what has been gained by coupling the relative significance of the four attributes of sound as applied to music and poetry with four more or less arbitrarily selected attributes of vision as applied to painting, sculpture and architecture.

The methods of art-composition are said to result, as applied to duration, in rhythm; as applied to extension, in proportion; as applied to quality and pitch of note and color, in harmony. All three, rhythm, proportion and harmony, are the result of grouping together effects of sound or sight that are alike, or multiples of others that are alike. Since all consciousness is due to vibrations of the nerves in the brain, the inference is that harmonious vibrations of the ether produce harmonious effects on the brain, allowing always for the change in medium which causes us to interpret things somewhat at variance with their actual external nature, and makes the effect rather than the cause the important factor.

In the application of this general theory a point or two may be worth noting. First, with respect to form as visual outline, it is concluded that the upright elliptical figure, or 'elliptic lanceolate,' is that form which requires the least visual activity, work, or effort to recognize it, and is therefore the one most conformed to the physiological requirements of the eye. The basis of this contention is that the fields of vision of the two eyes, each field taken to be circular, overlap to form a combined field, only the central portion of which, in the shape of an upright ellipse, is common to both eyes. The error in reasoning seems to be revealed when we consider that the fields of vision of the two eyes taken separately are horizontal ellipses rather than circles. The field of vision common to both eyes is, therefore, more nearly a circle than an 'elliptic lanceolate.' It is difficult to understand why lines which would coincide with, or run parallel to the limits of this field should be more easily apprehended than are any others. We must, therefore, conclude the author's point that the 'absence of like curves' such as are described in the 'elliptic lanceolate' makes for unæsthetic effects to be not convincing.

Another point is made in tracing the analogous effects of harmony in sound and color. The author's main thesis with regard to music

seems to be that harmonic relations are built on the basis of notes whose overtones are the most alike. Thus the relation of C to F is found to be the closest. This relation is numerically expressed as 3:4. Now, in the color scale the vibration rates, as given, extend from 392 to 757 'trillions' (the author of course means *billions*, though he uses *trillions* consistently throughout his book). This scale is conceived as analogous to the musical octave with the upper note omitted, *i. e.*, C to B inclusive. The author then finds that by applying the ratio 3:4 he can produce the most harmonious color combinations. This constitutes a very pretty analogy, if the facts bear him out; but even so it is not quite clear what advantage is gained in such an explanation of æsthetic effectiveness. Facility of physiological functioning doubtless plays a part in determining elementary æsthetic effects, but in view of our meager knowledge of the physiological mechanism of the eye and ear, it appears rather futile to juggle overmuch with seeming analogies of vibration rates. In the case of musical theory, there are many reasons why certain simple ratios should, in the history of the race, have attained a significance and ease of functioning. It is not quite so evident that analogous conditions should obtain within the narrower scale of visual stimulation, nor, in case they do, just in what sense the real problem has been clarified.

As a whole, the work lacks those psychological foundations which many of us consider desirable in a treatise on æsthetics. As a result, the subject matter is more that of art theory than of æsthetics in any broad sense. Yet the pervading tone is one of sanity and tolerance which will commend the book to many. Although we cannot, perhaps, agree entirely with the author's own estimate of his work, we can, at least, conclude our review by quoting it:

"It is gratifying to the author to be able thus in closing to point out that the conception of art and of its mission presented in this volume is one—and, probably, the only one—which can logically be made to harmonize with all those conceptions of right thinking and right living which, when applied to practice, have proved to be the most effective in promoting human welfare."

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DREAMS.

Le Reve. MARCEL FOUCAULT. Pp. 304. Paris, Alcan, 1906.

M. Foucault formulates his own theory of dreams, at the same time paying due regard to the discoveries and theories of other investigators. He illustrates the various points in his analysis by more

than a hundred new observations of dreams, some his own, and the remainder in most cases recorded by the persons who dreamed them. At the end, in a few pages of 'Conclusions,' he so admirably sums up the gist of the whole discussion, that the book could almost be reviewed from these alone.

The study of dreams involves two problems: first, how the memory of the dream is formed from the dream; and second, how the dream itself is formed. Foucault shows that in the memory of the dream logical transformations and supplementations play a large part. In particular he shows that in dreams which are complex, *i. e.*, which contain more than a single 'tableau' or incident, the actual dream at the beginning of the waking process is composed of several disconnected incidents or situations; that these are connected in serial order during the waking process, or afterwards; and that various elisions, additions, and alterations are effected in order to make the series coherent. This is finely illustrated by the observations, particularly those in which the recording was repeated, one record being made immediately on waking, the other some time later.

The principal cause of the dream itself is the proper force or spontaneity of images, by which they tend to return to consciousness and develop. Of this feature Foucault thinks not enough has been made heretofore. The force of the tendency for the image to reappear is determined by its habitual appearance, and its recency, or that of the perception from which it is drawn, as well as by its emotional associations. The attention given to the perceptions or images is of prime importance in governing the reappearance: those which were *least* attended to being most apt to recur. Foucault distinguishes, however, between ideas which hold the attention spontaneously and those which are held voluntarily, and admits that an image that is voluntarily attended to *may* return, though its liability to do so is relatively small.

The 'development' of an image is the calling up of other images to form a series with it. This proceeds through the above mentioned intrinsic force of the image, and is aided and controlled by conations, and, in perceptual and organic dreams, by peripheral stimulations which operate selectively on the imaginative material at the disposal of the developing series. In the realization of desired or abhorred conclusions in this way, the effect of attention is again seen, since the ones so realized are usually those which are not seriously expected in real life.

The incoherence of the complex dream before it has undergone

the logical operations succeeding sleep is due to the fact that in the sleeper's mind there are several of these series developing simultaneously and independently, the last portions of which are grasped as he wakes, the series being subconscious up to that moment. In the author's words, "the sleeping mind writes several books at the same time, but without knowing what it does. When it awakes it reads what it has written, but it reads the last pages of each of these books. Imagining that it must have written something rational it seeks to understand them by putting them together."

Many observations are cited in support of this theory, points being made on direct introspective confirmation, variability of time order of events in dreams, presence of more than one incident interrupted by waking, apparent repetition of an incident, and contradiction of incidents. This discussion remains, however, the least convincing portion of the treatise.

All sleep is dreamful, according to Foucault, and his observations seem to show that immediate introspection at any sudden waking will find dream images, which are forgotten with facility. He holds, moreover, to the doctrine that adaptative reactions indicate the presence of consciousness in the sleeper.

Many other interesting details are developed in the course of the treatise, and will well repay reading. The volume closes with the expression of M. Foucault's belief that the study of dreams will prove a very important means of probing into the subconscious.

KNIGHT DUNLAP.

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IDEALISM.

Experience and Objective Idealism. JOHN DEWEY. Philosophical Review, 1906, XV., 465-481.

Objective idealism in its recoil from sensationalism, in its effort to favor an absolute, external experience, while disowning the validity of experience here and now is forced into a quandary the only escape from which is to be found in the adoption of a complete functional empiricism.

Three important conceptions of the relation of reason to experience stand out in the history of idealism. In Greek philosophy the relation was one of sharp antagonism. By experience was meant activity, more or less skillful and habitual, the result of repeated effort, not based on any well-defined or consciously worked out technique. Hence it is connected always with *becoming*, not with being, and is

so subjected to this perpetual condition of change that it furnishes but an inadequate imitation of reality. Permanent and assured being is to be found only in the realm of ideality. Reason as the embodiment of significance is the source and guardian of the true, the beautiful and the good.

With the appearance of innate ideas and pure concepts the conflict between rationalism and empiricism was renewed. Experience, observation, according to the rationalist supplies but the data for thinking. It is the element that controls thought from without. This external material must be submitted to the qualifying transformation of conception before it can attain to the dignity of scientific knowledge.

As the outcome of Kant's revolt against subjectivism, which reduced experience to chance associations of sensations and ideas, the function of reason is further elevated. Thought no longer merely deals with perceptual data impressing it from without, it *constitutes* these data as objective, relates and organizes them.

These three conceptions of the relation of thought to experience suggest as many problems. In the first place, in what sense does thought as *a priori* constitute the objectivity of experience? Kantian idealism wavers continually between a point of view which reduces thinking to an empirical fact, an immanent function, a method of synthesis, experience's inherent mode of organization and one which exalts it to the position of a transcendental power determining in advance the character of experience. If Kant had held consistently to the first of these positions his reply to Hume would have resulted in the formulation not of an objective idealism but of a revised empiricism.

Further, the fact of attained organization in experience must be traced to habit rather than to thought, and about such organization there is nothing inherently sacred. Reason, itself a biological function, serves to evaluate organizations already existent, instincts, customs, habitual practical activities, social institutions. The concept is in fact nothing but these various activities brought to consciousness and so controlled and redirected. Thought is of service only in putting things in the way of helping themselves. Habits and institutions are always to be recognized as *tools*, to be employed for the sake of getting the fullest, freest activity possible and to be abandoned at the point where they limit that activity.

The second problem has to do with the relation of conception to perception. The error of idealism here is that of confusing observation as found in science with the nature of perception in a concrete, non-scientific experience. The distinction between inference and ob-

servation in scientific reasoning is a deliberate methodological one. In scientific observation there is a persistent conscious attempt to escape meaning, to get at the bare facts in order that a more permanent and assured meaning may be obtained. In failing to see the purely instrumental character of this distinction Locke furthered the conception of thought as supplying a necessary element to mere brute description. Perception not of the scientific, analytic type is an activity in which we have the adjustment of an organism to its environment with discrimination and mutual reference of objective conditions. In experiences of this kind it is impossible to make the separation between observation and thought, since perception arising out of a concrete need, seeking a definite purpose, comes weighted with incalculable ideal, emotional and æsthetic values.

The third mistake of objective idealism is that of supposing ideals to be eternally and absolutely *given*. It is rather the *non-givenness* of an ideal value which makes it ideal, something more, that is, than purely natural. The objective idealist must either agree to the complete embodiment of this fixed law of goodness in experience past, present and to come, an agreement committing him to a mechanical theory, or he must accept it as so separated from experience as to be absolutely ineffective. Experience from the side of memory supplies principles of action true enough to afford a satisfactory working basis for the future. An ideal is an anticipated value formulated on the basis of past activity. It is relative, transitory, but its thoroughly empirical nature detracts not at all from its 'grace and severity' as an ideal. Normative values are not given once and for all but are found within experience in continual process of change and development. The function of intelligence is the control of this changing meaning of experience for the attainment of those ideals which are at one and the same time most flexible and most worthwhile.

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WEIGHT SENSATIONS.

Beiträge zur Psychodynamik der Gewichtsempfindungen. ALFRED LEHMANN. Arch. für die ges. Psychol., 1905, VI., 425-499.

It was the original intention of the author to incorporate the material of this article in his *Elemente der Psychodynamik* which appeared in 1905 as the third part of the *Körperliche Aeusserungen psychischer Zustände*. In order not to delay the publication of that work, however, the discussion of weight sensations was omitted and is published here. This was unfortunate, since the article as it stands is

anything but clear and luminous to one who has not mastered the contents of the *Elemente*. The latter work is without doubt a valuable contribution to the literature of psychophysics, and supplements in a highly ingenious manner the efforts of Fechner and G. E. Müller to obtain by elaborate mathematical calculations and equations an exact expression for the relations between mental and physical phenomena. Whether the results obtained from the attempt to express the variable and complicated processes of mental life in the exact terms of mathematical formulæ repay the time and effort expended—whether a simpler and more direct statement of the outcome of experimental investigation would not further the advancement of psychological science better than such involved mathematical formulation, is an open question. The doubts expressed by Külpe, in a criticism of the second part of the *Körperliche Aeussierungen psychischer Zustände*, as to the relative value of this mass of mathematical ‘speculations, evolutions and equations, in which a whole army of postulates, simplifications and combinations are involved,’ also apply to the *Elemente der Psychodynamik*, and *a fortiori* to the present article. The *Elemente*, however, is a work of great interest even to the non-mathematical psychologist, in view of the fact that here we have the first consistent attempt, to my knowledge, to carry through the important physiological concepts of inhibition (Hemmung) and reinforcement (Bahnung), and to show their influence throughout the whole range of psychophysiological processes. The conception of reinforcement as the cause of association is one which is bound to attract attention.

The present article is an attempt to show that the law of reinforcement, as developed in the *Elemente*, and the equations which represent its mathematical statement as applied to sound sensations are also true of weight sensations. Further, the ‘negative time error’ and other ‘errors’ of Fechner and Müller are to be explained as due to the law of reinforcement. Throughout the article this law of reinforcement is repeatedly referred to, but nowhere are we told what it is. Referring to the *Elemente*, however, we find the following statement of it on page 46: “If a sensation produced by a stimulus R reinforces a succeeding sensation produced by a stimulus r , the intensity of the latter sensation will be increased just as if the stimulus r had received an increase uR^v , where u and v are functions of the time interval between the two stimuli.” From mathematical statements of the relationships involved in this law there are developed by complicated mathematical combinations sixteen different equations to express the relations of stimulus to sensation in lifted weights. Experiments were

carried on for eighteen months with weights from 150 to 5,000 grams and the tabulated results are compared with results calculated by aid of the formulæ. These two classes of results show an agreement which, while not exact, is at least satisfactory to the author.

Two interesting points come out in the interpretation of the experimental results. The standard weight was always lifted first. With the heavier standards the second weight, subjectively equal to the first, was uniformly lighter objectively, *i. e.*, showed a negative time error, which is explained by the law of reinforcement. But the lighter standards showed a positive time error. This is accounted for on the assumption that the reinforcement is very slight for light weights, but lifting the first weight acts as an adjustment for the motor innervation in lifting the second; hence the second seems lighter and requires more weight than the first to establish subjective equality. If the standard be lifted twice with pauses of four seconds between, and then compared with the second, the innervation is adjusted before the comparison is made, and there results a slight negative time error such as might be expected from the slight reinforcement.

When weights are lifted slowly, as in this investigation, the chief factor in their estimation is undoubtedly the sensation of strain. But sensations of pressure also enter in. The standard 1,500 gram weight was provided with a rough pasteboard handle. For the compared weight a box with a smooth handle was at one time used. Instead of the negative error a positive error of 365 grams resulted. With the same kind of handle on both weights the usual negative error of 100 grams was obtained. A similar difference was observed with other standards. Weight experiments, therefore, involving different kinds of contact surface are quite incomparable.

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BOOKS RECEIVED FROM JUNE 5 TO JULY 5, 1907.

La Physionomie humaine, son mécanisme et son rôle social.

I. NAGNBAUM. Paris, Alcan, 1907. Pp. 320. Fr. 5.

On the Functions of the Cerebrum: the Frontal Lobes. S. I.

FRANZ. In Arch. of Psychology. New York, The Science Press, 1907. Pp. 64.

Systematische Philosophie. DILTHEY, RIEHL and others. Th. I,

Abt. 6, of Cultur der Gegenwart. Berlin and Leipzig, Teubner, 1907. Pp. viii + 432. M. 10 and 12.

- The Manual of Statistics; Stock Exchange Hand-book, 1907.* New York, Man. of Statistics Co., 1907. Pp. 1064. \$5. [A remarkably complete and useful manual for the investor or student of securities of all sorts.]
- Beiträge zum Problem des "Gegebenen" Erster Beitrag.* K. GROOS. Giessen, the Author, no date (1907). Pp. 20.
- Pragmatism, a New Name for Some Old Ways of Thinking.* WILLIAM JAMES. New York and London, Longmans, 1907. Pp. xiv + 309.
- The Roots of Reality, being Suggestions for a Philosophical Reconstruction.* E. BELFORD BAX. London, Richards, 1907. Pp. 10 + 331. 7/6 net.
- Remarques sur la Monadologie.* J. PAUL MILLIET. Paris, Jacques, 1907. Pp. 80.
- Les Bases de la Philosophie Naturaliste.* ANDRÉ CRESSON. Paris, Alcan, 1907. Pp. iii + 180. 2 fr. 50.
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- The Major Symptoms of Hysteria.* PIERRE JANET, M.D. New York, Macmillan, 1907. Pp. x + 346. \$1.75.
- Lectures on Humanism.* J. S. MACKENZIE. New York, Macmillan, 1907. Pp. vi + 244. \$1.25.
- Twenty-fourth Annual Report of the Bureau of American Ethnology.* 1907, Washington. Pp. xl + 846.
- Tariffs, Reciprocity and Foreign Trade.* The Annals of the American Academy of Political and Social Science. Philadelphia, May, 1907. Pp. 226. \$1.
- Report of the Commissioner of Education for the year ending June 30, 1905.* Volume I. Washington, 1907. Pp. li + 655.
- Naturwissenschaft und Weltanschauung. Vortrag gehalten auf der 78 Versammlung deutscher Naturforscher und Ärzte in Stuttgart von THEODOR LIPPS.* Heidelberg, Winter, 1906. Pp. 40.
- Psychology: General Introduction.* CHARLES HUBBARD JUDD. New York, Scribners, 1907. Pp. xii + 390.
- Laboratory Manual of Psychology.* CHARLES HUBBARD JUDD, New York, Scribners, 1907. Pp. xii + 128.
- L'Orientazione Psicologica dell' Etica e della Filosofia del Diritto.* PROF. ALESSANDRO BONUCCI. Perugia, Bartelli, 1907. Pp. 384. L. 7.50.

NOTES AND NEWS.

Prof. Pierre Janet's lectures at Harvard on Hysteria are to be published at once by The Macmillan Co., with the title *Major Symptoms of Hysteria*.

Dr. W. C. Ruediger has been appointed Asst. Professor of Educational Psychology in the George Washington University.

Dr. J. Carleton Bell, Instructor in Experimental Psychology, Wellesley College, has been appointed to take charge of the new psychological laboratory in the Brooklyn Training School for Teachers.

At a recent meeting of the Board of Trustees of the University of Illinois, the following promotions and additions were made in the department of psychology:

Dr. Stephen S. Colvin, Associate Professor, to be Professor.

Dr. John W. Baird, Instructor, to be Assistant Professor.

Dr. Fred. Kuhlmann, Assistant in Psychology at Clark University, to be Instructor.

The department has grown rapidly in numbers in the last few years.

It will be given new and ample quarters in the addition to the Natural History Building which will probably be open for use in September, 1908.

